Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

June 25, 2012

Mr. Dwight Leisle
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Re: Revision to Proposed Surface Soil Sampling — Former Wharf Road Area
Willamette Cove Upland Facility
Portland, Oregon
ECSI No. 271
1056-02

Dear Mr. Leisle:

This letter presents the revised scope for proposed surface soil sampling activities in the former Wharf Road Area. The sampling activities are being conducted to support the preparation of the Source Control Evaluation (SCE) for the Willamette Cove Upland Facility (the Facility; Figures 1 and 2) in the St. Johns area of Portland, Oregon. Work at the Facility is being conducted under Voluntary Agreement EC-NWR-00-26 between the Port of Portland (Port), Metro, and the Oregon Department of Environmental Quality (DEQ).

The DEQ issued a DRAFT comment letter dated September 28, 2009 indicating that additional investigation was necessary to complete the SCE. The *Source Control Sampling Work Plan* was submitted on March 31, 2010. The DEQ issued additional comment letters (dated January 15, February 3, May 7, and July 30, 2010). The Port submitted a *Source Control Sampling Work Plan Addendum* dated September 12, 2010, and implemented the Work Plan in the fall of 2010. The Port submitted a *2010 Source Control Sampling Results* data report on May 6, 2011.

The DEQ has requested further characterization of the dioxin/furans in surface soil in the former Wharf Road area (composite sample WC-1/2/3 and discrete follow-up samples WC-1, -2, and -3; Table 1) based on the results of the fall 2010 sampling. The Port submitted the *Proposed Surface Soil Sampling* approach in a letter dated July 22, 2011. The scope of the sampling has been revised based on follow-up communication between the DEQ, Port, and Metro. The revised scope includes collection of surface soil samples using an incremental sampling approach.

BACKGROUND

Sampling of erodible soil in the former Wharf Road area was initially requested in response to the DEQ's concerns that the riverbank armoring was incomplete. Following field observations for exposed soil, the DEQ indicated that erodible soils were not easily accessible due to thick and continuous armor cover. As an alternative, the DEQ requested that surface soil from the heavily vegetated bench area above the ordinary line of high water (OLHW) be sampled in the footprint of the historical Wharf Road. Shallow surface samples (WC-1 through WC-3; Figure 3) were collected following removal of the vegetated cover. A three-point composite surface soil sample (WC-1/2/3) was collected and discrete samples from each sub-sample location were collected and retained.

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The chemical analyses included total petroleum hydrocarbon (TPH) hydrocarbon identification (HCID) by Northwest Method NWTPH-HCID, Priority Pollutant 13 Metals, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270-SIM, polychlorinated biphenyls (PCBs) by EPA Method 8082, dioxins/furans by EPA Method 8290, and butyl tins (Krones Method). A follow-up analysis for diesel- and oil-range TPH by Northwest Method NWTPH-Dx (with silica gel cleanup) was completed on the composite sample. Additional follow-up analyses for metals and dioxins/furans were completed on the discrete samples due to exceedances of screening level values (SLVs) from the Joint Source Control Strategy (JSCS) guidance document (DEQ/EPA 2005; screening criteria revised July 16, 2007). PCBs, PAHs, and butyl tin concentrations in the composite sample were below the method reporting limits (MRLs) and/or below the applicable screening values.

PROPOSED SAMPLING ACTIVITIES

Preparatory Activities

The following activities and schedule coordination will be completed in preparation for the field work.

- Health and Safety Plan (HASP). Ash Creek Associates (Ash Creek) will update the HASP for its personnel involved with the project.
- Coordination of Facility Access. The work activities will be conducted in coordination with Metro.

Surface Soil Sampling

The following protocol was prepared based on the *ITRC Technical and Regulatory Guidance Incremental Sampling Methodology* (dated February 2012).

Surface soil samples will be collected from three decision unit areas (DU-1 through DU-3) using an incremental sampling technique to assess the extent of dioxin/furans (Figure 3). Two samples will be collected laterally and one toward the top of the riverbank slope. The lower margin of the decision units begins at the approximate Mean High Water Line. Each decision unit is comprised of a 50-foot and 100-foot area. As per DEQ's request, the proposed sample locations were overlaid on a historical aerial photograph (Figure 3).

Each incremental sample will consist of thirty soil increments collected from the center of each of the 10 by 17 foot rectangular grids presented on Figure 3. The grid intersections within each decision unit will be established using a high-accuracy, handheld global positioning system (GPS) device (Trimble© GeoXH™). Hand taping methods will be employed to augment the use of the GPS in areas of reduced satellite coverage. The lower portions of the lateral decision units will overlap the armoring present on the riverbank. If the center of the grid is not sampleable (e.g., due to the presence of armor rock) the sample location will be moved, as necessary, to the nearest sample location that is sampleable. Final sample locations will be documented in field notes.

The soil increments will be collected from the top 6 inches of surface soil after removing vegetation. The target mass of each increment will be approximately 50 grams in order to achieve the overall target sample mass of 1.5 kilograms. A six-inch hole will be initially excavated with hand tools (e.g., hand trowel, hand auger, etc.). A 50-gram increment will be collected from the sidewall of the hole using a sampling spoon and added to the sampling container for the decision unit. Sieving will be completed by the laboratory as part of the sample drying process, but care will be taken to avoid particles larger than 2 millimeters where practicable. Traditional replicate analyses are not planned, but a blind duplicate sample will be collected from DU-1 (in the northeast corner of each grid).

Non-disposable items (e.g., hand trowels, spoons, etc.) will be cleaned by washing in a detergent (Alconox®) solution, rinsing with tap water, followed with a deionized water rinse prior to initiating sampling and between sampling for each decision unit.

CHEMICAL ANALYSES

The chemical constituents detected above the JSCS SLVs in the former Wharf Road Area surface samples were metals and dioxins/furans (Table 1). The reported metals results were within the detected range of concentrations for samples collected along the extent of the riverbank at the Facility in 2010. The dioxin/furan results were elevated relative to the conservative JSCS SLVs. Consequently, the soil samples will be submitted for chemical analyses on a normal turnaround basis for dioxins/furans by EPA Method 8290. The requested method reporting limits (MRLs) will be consistent with the laboratory analyses completed in fall 2010.

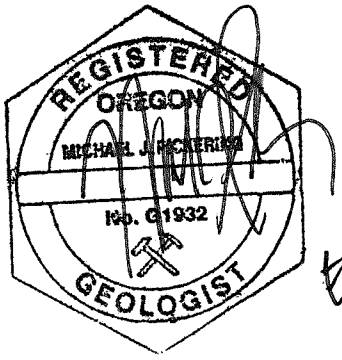
The incremental samples will be sent to Pace Analytical in Seattle, Washington for processing and analysis. The samples will be processed according to the Pace Analytical internal standard operating procedure (SOP) for the processing of incremental samples (Attachment A; refer to sections 11.4.2 and 11.4.3). The final mass following air drying and sieving will be recorded by the laboratory. No sampling grinding or milling is planned. Laboratory quality assurance/quality control (QA/QC) will include a method blank and a batch laboratory control sample (LCS)/ laboratory control sample duplicate (LCSD). No laboratory replicates are planned, but a blind field duplicate will be collected and analyzed.

REPORTING

The results of the sampling proposed in this letter will be discussed with the DEQ. If necessary, additional sampling to complete the characterization of the dioxin/furans in the former Wharf Road area will be recommended. The final results will be presented in a letter report and included in the Residual Risk Assessment.

If you have any questions regarding these activities, please contact the undersigned at (503) 924-4704.

Sincerely,



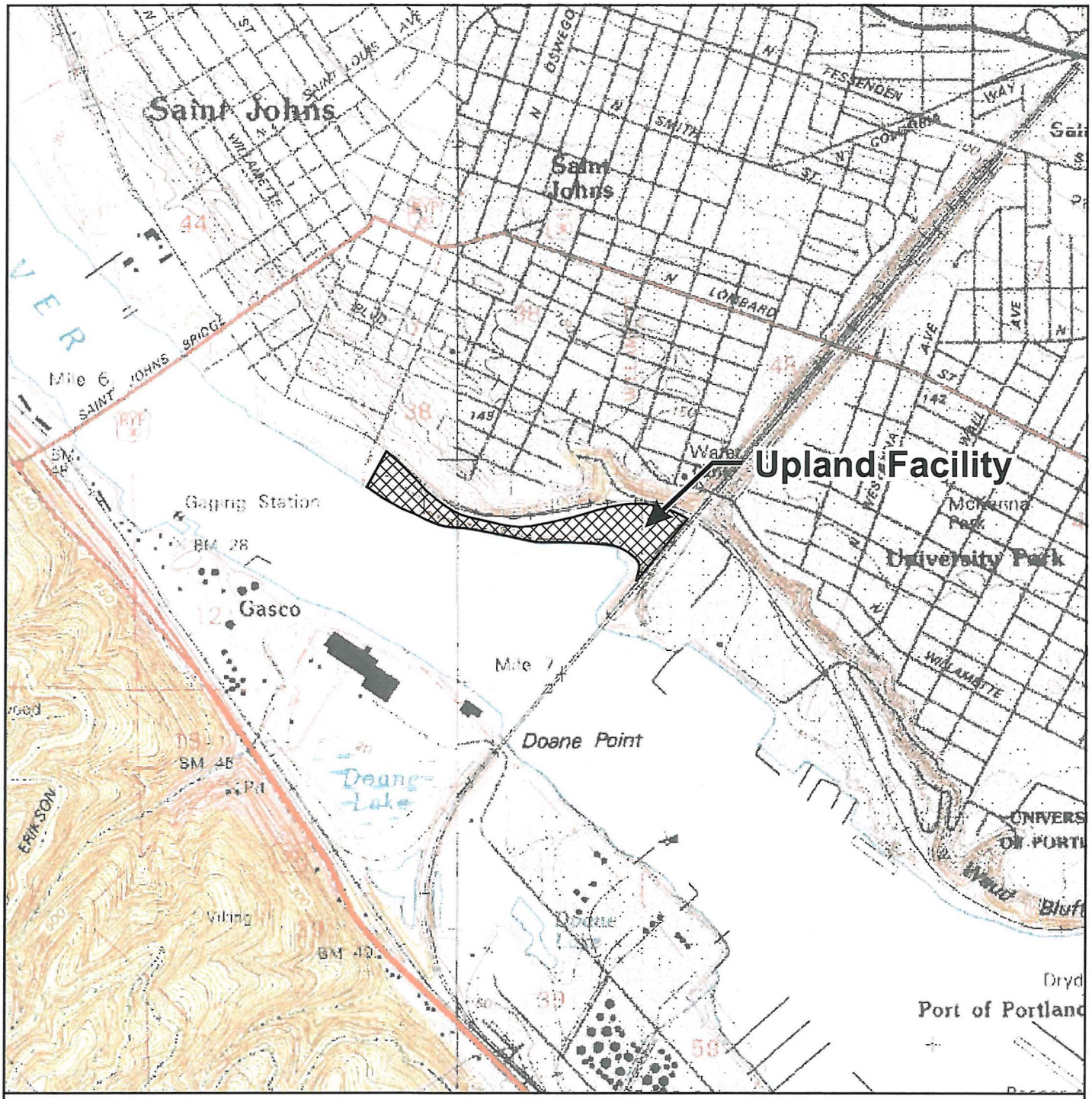
EXPIRES 12/31/2012

Michael J. Pickering, R.G.
Senior Associate Hydrogeologist

ATTACHMENTS

Figure 1 – Facility Location Map
Figure 2 – Upland Facility Map
Figure 3 – Former Wharf Road Area Explorations

Attachment A – Pace Standard Operating Procedure – Sample Homogenization and Sub-Sampling



Base map prepared from USGS 7.5-minute quadrangles as provided by TerraServer.

0 2,000 4,000

Approximate Scale in Feet

N

Facility Location Map

Revision to Proposed Surface Soil Sampling
Port of Portland / Metro
Willamette Cove Upland Facility - Portland, Oregon

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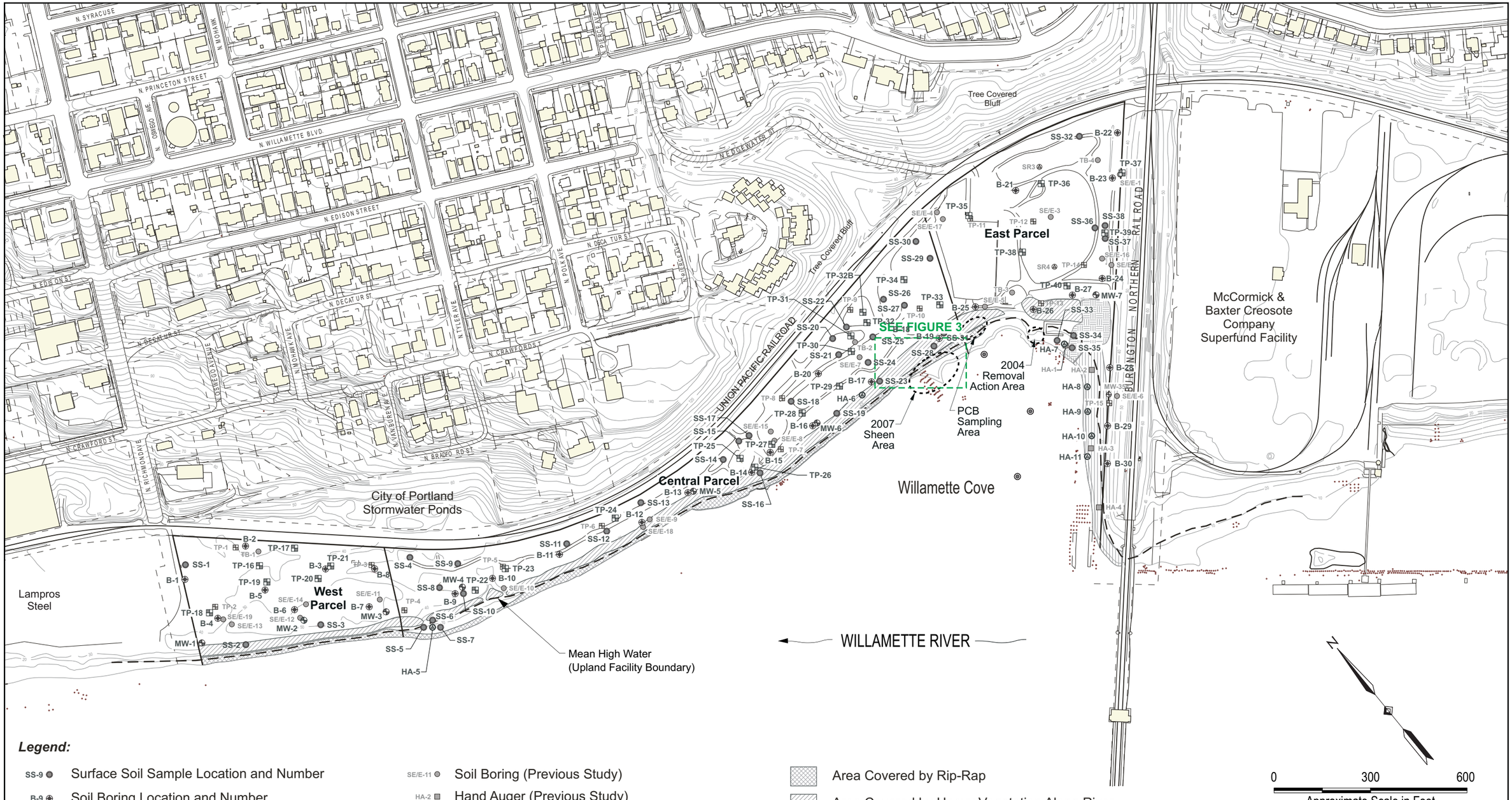
APEX

Project Number	1056-02	Figure
May 2012		1



Legend:

- SS-9 — Surface Soil Sample Location and Number
- B-9 — Soil Boring Location and Number
- HA-5 — Hand Auger Soil Boring Location and Number
- TP-24 — Test Pit Location and Number
- MW-5 — Monitoring Well Location and Number
- Sediment Sample Location
- SE/E-11 — Soil Boring (Previous Study)
- HA-2 — Hand Auger (Previous Study)
- TP-4 — Test Pit (Previous Study)
- SR4 — Surface Soil Sample (Previous Study)
- MW-35s — Monitoring Well Location and Number (Previous Study)
- Area Covered by Rip-Rap
- Area Covered by Heavy Vegetation Along River
- Area Covered by Clean Imported Sand
- Area of Armored Sediment Cap

Note: Base map prepared from an electronic file provided by Hart Crowser.

Upland Facility Plan

Revision to Proposed Surface Soil Sampling
Port of Portland / Metro
Willamette Cove Upland Facility - Portland, Oregon

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Project Number	1056-02
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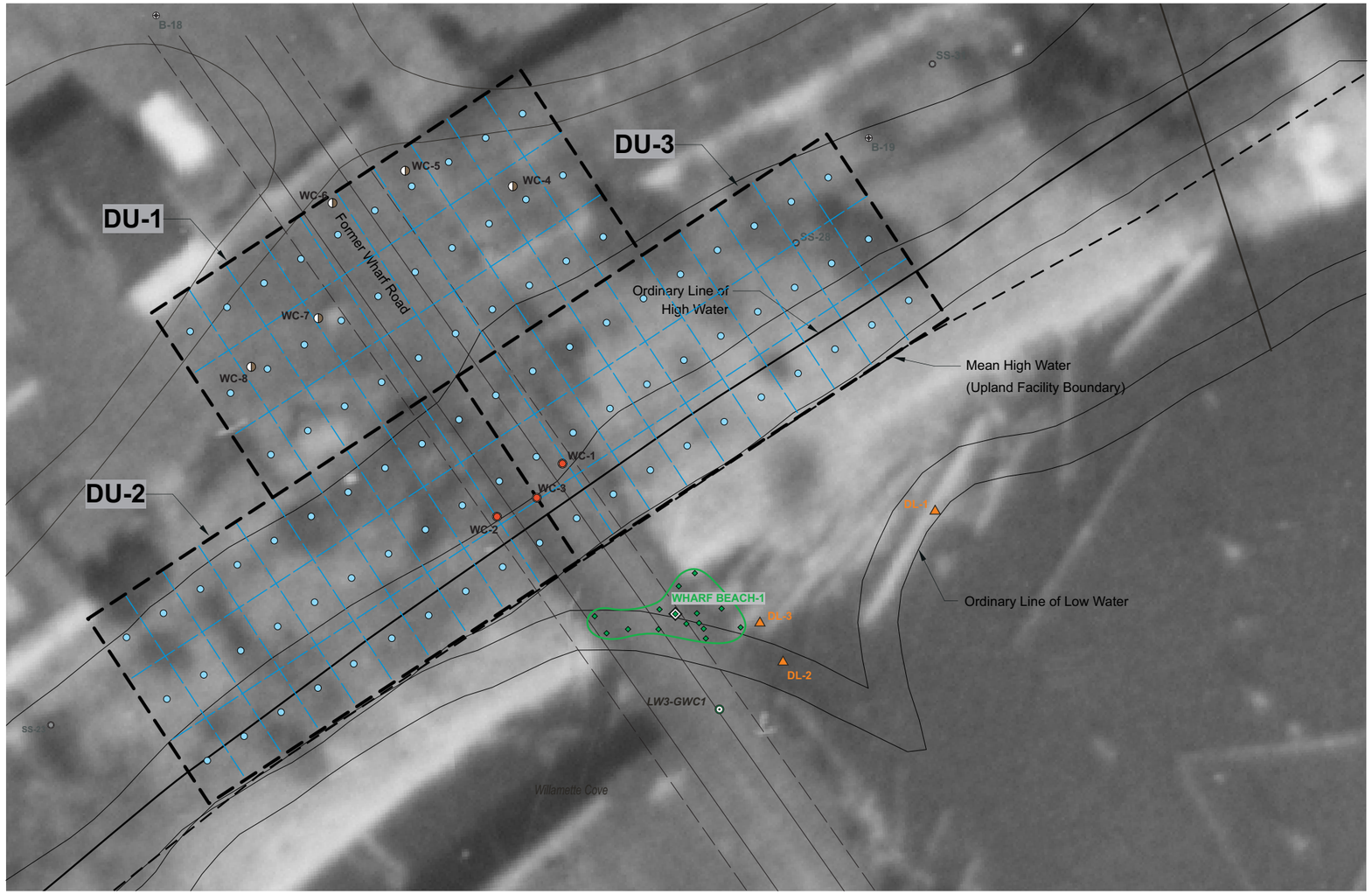
Figure 2



N

0 30 60

Approximate Scale in Feet

Legend:

- SS-9 — Surface Soil Sample Location and Number
- B-9 — Soil Boring Location and Number
- *LW3-GWC1* — LWG Sample Location
- DL-1 — Beach Sediment Sample (September 2007)
- Shovel Pit Exploration Locations
- WHARF BEACH-1 — Shovel Pit Sample Location
- WC-4 — Push-Probe Sample Location (2010)
- WC-1 — Surface Soil Sample Location (2010)
- Proposed Incremental Sample Decision Unit
- Sample Grid Overlay
  Incremental Sample Point

Note: Base map prepared from an electronic file provided by Hart Crowser and a USACE 1961 aerial photograph.

Former Wharf Road Area Explorations

Revision to Proposed Surface Soil Sampling
Port of Portland / Metro
Willamette Cove Upland Facility - Portland, Oregon

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Attachment A

Pace Standard Operating Procedure - Sample Homogenization and Sub-Sampling

Pace Analytical®
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STANDARD OPERATING PROCEDURE

SAMPLE HOMOGENIZATION AND SUB-SAMPLING

Reference Methods: N/A

LOCAL SOP NUMBER:	S-SEA-L-002-rev. 01
EFFECTIVE DATE:	Date of Final Signature
SUPERSEDES:	S-SEA-L-002-rev. 00
SOP TEMPLATE NUMBER:	S-ALL-Q-021-rev.03

LOCAL APPROVAL

Laboratory General Manager — Date 1/25/10

Laboratory Quality Manager — Date 1/25/2010

PERIODIC REVIEW

SIGNATURES BELOW INDICATE NO CHANGES HAVE BEEN MADE SINCE PREVIOUS APPROVAL.

Signature	Title	Date

TABLE OF CONTENTS

1. Purpose

This purpose of this SOP is to provide a laboratory specific procedure for handling, homogenizing and splitting samples to ensure that a representative sample aliquot is used for analysis or composite.

2. Scope and Application

2.1. This procedure is restricted to use by, or under the supervision of, analysts experienced in the preparation or analysis of samples. This procedure is applicable to all solid, liquid and biological samples. Certain types of testing may limit the types of materials used and the techniques employed in the homogenization procedure. This includes the composition of the containers and mixing devices and the degree to which a sample may be mixed or blended.

3. Summary of Method

3.1. Solid, liquid or biological samples are thoroughly mixed or blended to ensure that any aliquots taken are representative of the sample as a whole. The samples are mixed in either their original containers or, in the event that original container does not allow for adequate mixing, transferred to an inert container for thorough homogenization.

3.2. Analysts must make reasonable judgments when sub-sampling materials in order to obtain a homogenous, representative aliquot of the material. Because of the nature of environmental samples, the analyst may have to treat samples on a case-by-case basis ensuring that all aspects of the analytical method are performed. In the event that the analyst cannot reasonably determine what constitutes a representative sample, the project manager or supervisor must be involved so that the client can help ensure an appropriate representative aliquot is utilized.

4. Interferences

4.1. Metallic Devices – Samples to be analyzed for metal constituents must not be homogenized using any metallic mixing devices or containers as it may result in contamination of the sample with a variety of metals. Use only glass, plastic or ceramic materials when working with these sample types. Wooden spatulas are also acceptable as mixing devices. This may not be applicable for tissue samples since metallic devices (blenders, etc.) may be necessary for grinding and chopping prior to sample homogenization.

4.2. Plastic Devices – Samples to be analyzed for organic constituents must not be homogenized using any plastic mixing devices or containers as it may result in both positive and negative interferences. Use only glass and ceramic devices when working with these sample types. Wooden spatulas are also acceptable mixing devices. Metal instruments may also be used if analysis for metals is not required from the same sample.

5. Safety

5.1. Samples - Take precautions when handling samples to prevent unnecessary exposure. Samples should always be treated as potentially hazardous "unknowns". The use of personal protective equipment (gloves, lab coats and safety glasses) is required when handling samples. The type of gloves utilized must take into account the analyses to be performed to prevent contamination. Nitrile gloves are recommended to avoid plasticizers. In the event a sample container must be opened, it is recommended to perform this in a hood whenever possible. All distillations should be conducted under a fume hood.

5.2. Equipment – Homogenization and sub-sampling may require the analyst to exert a fair amount of force when blending certain samples. Every precaution must be taken to prevent injuries such as cuts and punctures when performing these procedures. Particular attention must be given to the potential for broken glassware due to exertion.

6. Definitions

6.1 Refer to Glossary section of the Pace Quality Assurance Manual (QAM) for a comprehensive list of terms and definitions.

7. Sample Collection, Preservation and Handling

7.1. Details concerning sample collection, preservation and storage can be found in the applicable analytical SOPs. Samples must be stored separately from all standards and reagents. Where possible, samples for trace analysis should be segregated from highly contaminated samples to avoid cross contamination. Food or drink products must always be kept away from samples and never stored in the same area with samples.

8. Equipment and Supplies

8.1 Spatulas – Metal, plastic, glass or wood depending on sample composition and requested analyses (i.e., a metal spatula should never be used to measure out a solid sample for any metals analysis)

8.2. Balance (analytical or top loading as applicable for level of sensitivity needed)

8.3. Sample Mixing Containers – Metal, plastic, glass or ceramic depending on the sample composition and requested analyses

9. Reagents and Standards

9.1. Not Applicable

10. Calibration

10.1. Calibrate the balance as directed by the manufacturer.

11. Procedure

11.1. **Soils/Solids**

11.1.1 An analyst examines the sample as received by the laboratory. If standing water is noted on top of a soil or sediment sample, the project manager is notified and obtains direction from the customer regarding whether to decant the water or whether to incorporate the water into the sample. In the event the customer is unable to provide direction, the standing water is decanted and disposed. Any foreign material, not subject to analysis, must be removed and discarded. This material may include sticks, leaves, rocks, etc. that are not or cannot be analyzed for that particular procedure. Any questions related to the nature of the sample should be directed to the project manager. The project manager will work with the client to help determine what should be considered foreign material.

11.1.2. The remaining sample must be homogenized until the point of an even consistency throughout the entire sample. The easiest option, for non-volatile samples, is to mix the sample thoroughly in the original container. The sample is considered thoroughly mixed once all layers, colors and inconsistencies have been evenly distributed throughout the container. If additional mixing is still required to get an even consistency, proceed to the next step.

11.1.3. If mixing is difficult in the original container, the analyst should transfer the entire sample into a larger, clean container and attempt homogenization there. After mixing, return the homogenized sample to its original container. If homogenization within the container was successful, this step may be omitted.

11.1.4. After mixing thoroughly, the analyst should take out a representative aliquot to use for preparation or analysis. The analyst must not add or remove minute quantities of sample from the representative aliquot in an attempt to target a specific final weight. If an analyst weighs out slightly more than the required weight of sample, they have not adversely impacted the reporting limit for that sample. If applicable, the analyst should also weigh out portions of the sample for duplicate or spike analysis at this time so that all aliquots are approximately equal to each other. When taking aliquots for QC samples, they must be taken one after the other from the container. A larger amount of sample may not be removed from the container, mixed further and then subdivided.

11.1.5. For volatile soil samples, the analyst must attempt homogenization as quickly as possible to minimize the loss of volatile analytes. This may limit the amount of mixing that can be done on the sample. The analyst may have to quickly take aliquots from several different spots within the sample jar to achieve the best homogenization possible in the shortest amount of time.

11.1.6. Other options for soil homogenization may be employed if requested by a particular client. When employing a client-requested method, there should be clear documentation in the preparatory and analytical logbooks stating the method used.

11.2. Water/Liquid

11.2.1. Water samples are homogenized by shaking the sample bottle prior to pouring an aliquot. This applies to non-volatile analytical methods only. If a sample contains distinct layers – either liquid or solid – the department supervisor should be consulted to determine the most appropriate means of homogenizing and splitting the sample.

11.3. Biological Sample (Fluids and Tissue)

11.3.1. Ground and homogenized biological tissue requiring non-volatile analyses must be mixed in the container and sub-sampled in accordance with section 11.1. Ground and homogenized biological tissue requiring volatile analyses are sub-sampled in accordance with section 11.1.5. Blood or serum samples requiring non-volatile analyses are homogenized by gently shaking the container prior to measuring an aliquot for digestion or extraction

11.4 Discriminate Sampling (Ramsey and Suggs 2001):

11.4.1 Usage:

11.4.1.1. The techniques described in the section are only used upon client request or contractual agreement.

11.4.2 Homogenization:

11.4.2.1 Place entire field sample on appropriate surface or container (solvent-rinsed pan for organics, disposable plastic pan for inorganics, or a paper sheet when preparation for both analyses are required). Allow to air dry overnight.

11.4.2.2 Since sampling in the field is supposed to have provided a representative sample to a set particle size, removal of rocks, twigs, and other extraneous materials and artifacts will not be required. If any of these materials are present, contact the Project Manager so they can contact the client for guidance.

11.4.2.3 Break up the sample with a spatula or wooden tongue depressor. Reduce the sample size to approximately 2mm (pass through a Tyler #9 sieve) when required by specific projects otherwise reduce sample size as required in sections 5 and 6.

11.4.3 Representative sub-sampling:

11.4.3.1 Lay out the entire dried and sieved sample evenly on an inert, flat surface. Subsample 30 random (about 1g) increments from evenly distributed locations (systematic random) around the area of the sample using a sampling tool capable of capturing the entire distribution of grain sizes present in the sample. A normal curved spatula is not acceptable, but the spatula can be reformed to have a flat bottom with sides to capture the 1g increments.

11.4.3.2 When analytical methods require the use of <30g sample for analysis, 30 increments of a smaller subsample (i.e. down to approximately 0.15g to produce a 5g sample) are allowed.

11.4.3.3 When analytical methods still require less than a 5g sample for analysis, the 5g incrementally collected subsample is laid out and sectioned to obtain an indiscriminate sample.

12. Quality Control

12.1. All QC samples must be treated in the same manner as any other samples. No additional homogenization is permitted for samples being used as duplicates or MS/MSD pairs. If additional homogenization is required to achieve consistent results, all samples must undergo homogenization in the same manner.

13. Method Performance

13.1. The analyst must read and understand this procedure with written documentation maintained in the training file.

14. Pollution Prevention and Waste Management

14.1 Procedures for handling waste generated during this analysis and through the disposal of the remaining sample are addressed in the most recent version of the lab's waste handling procedures.

14.2. In order to minimize the amount of waste generated during this procedure, analysts should prepare reagents in an amount which may be used in a reasonable amount of time (i.e. before a reagent expires).

14.3. The company wide Chemical Hygiene and Safety Manual contains additional information on pollution prevention.

15. References

15.1. CERCLA Quality Assurance Manual; October 1989

15.2. National Environmental Laboratory Accreditation Conference, Chapter V Quality Systems, most current version..

15.3. "Improving Laboratory Performance Through Scientific Subsampling Techniques"; Ramsey and Suggs, Environmental Testing and Analysis; March/April 2001.

15.4. Pace Quality Manual - Pace Analytical Services, Inc., most recent revision.

16. Tables, Diagrams, Flowcharts, Attachments, Appendices, etc.

16.1. Not applicable to this SOP

17. Revisions

Document Number	Description of Change	Date
S-SEA-L-002-rev.00	Converted to Pace format and numbering system. Added sections 2.1 and 3.1. Added default Safety section from other Pace SOPs. Section 8: converted information into chart form. Section 9: converted information into chart form. Section 15: added references to Pace QAM and the NELAC standard.	17Jun2009
S-SEA-L-002-rev.01	Section 11.2.1.1: amended to fit current practices Section 11.2.3.1: removed references to CLP and SW-846 Section 15: added reference to Pace QAM and the NELAC standard Section 11.1 Incorporated Pace procedures for soils/solids. Section 11.2 Incorporated Pace procedure for water/liquid Section 11.3 Incorporated Pace procedure for biological samples Section 8 Removed table, incorporated Pace equipment Section 9 Removed table Changed title to incorporate Pace Corporate Template	25 January2010